Ports and Waterways Safety Assessment Workshop Report

Wilmington, North Carolina 11 – 12 June 2024



Providing Navigation Safety Information for America's Waterways Users

> Released By: CAPT Margaret Kennedy Commanding Officer U.S. Coast Guard Navigation Center

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Executive Summary

Coast Guard Sector North Carolina sponsored a Ports and Waterways Safety Assessment (PAWSA) workshop in Wilmington, NC, from June 11, 2024, to June 12, 2024. Twentythree participants representing a range of waterway users, stakeholders, federal, state, and local regulatory and public safety authorities met to collaboratively assess navigational safety on the waterways adjoining the port of Wilmington. Prior to the workshop, the Coast Guard Navigation Center (CG NAVCEN) facilitated a stakeholder engagement meeting on February 22, 2024, to enhance community outreach and prepare stakeholders for the formal workshop. This report provides a visual depiction of the study area and contains the full list of workshop participants and their associated organizations. The first day of the workshop included discussions about port and waterway attributes and vessel traffic in relation to the sixteen Waterway Risk Factors (WRFs) in the PAWSA Waterway Risk Model, which is described in more detail in this report. The Baseline Risk Value (BRV) and Risk Characterization for each WRF were established based on participants' survey responses. BRV quantifies the overall risk, whereas Risk Characterization assesses the potential consequence, risk trend, risk tolerance, and effectiveness of existing mitigation strategies for a specific WRF. The metrics from the BRV and Risk Characterization were combined to quantitatively prioritize WRFs to inform discussions during the next phase of the workshop. During the second day, participants reviewed and validated the aggregated survey ranking of the WRFs and conducted follow-on discussions to identify and develop risk mitigation strategies. The five numerically highest WRFs ranked by participants are documented in the table below with their associated Waterway Risk Condition. This report contains a full list of prioritized WRFs with additional details.

Waterway Risk Condition	WRF
Vessel Quality & Operation	Large Commercial Vessel Quality
Navigation	Tides & Currents
Vessel Quality & Operation	Recreational Vessel Quality
Traffic	Volume of Commercial Traffic
Traffic	Waterway Use

The recommended mitigation strategies and participant observations documented in this report will meaningfully facilitate continued collaboration between the Coast Guard and waterway stakeholders to improve safe and efficient navigation within the Wilmington Marine Transportation System (MTS). The Director of Marine Transportation Systems (CG-5PW), CG NAVCEN, and CG Sector North Carolina extend their sincere appreciation to participants for their contributions to the Wilmington PAWSA workshop.

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CHAPTER 1. GENERAL

A. Background and Purpose

- CG-5PW is responsible for developing and implementing policies and procedures that facilitate commerce, improve safety and efficiency, and maximize the commercial viability of the MTS. In the late 1990s, the Coast Guard convened a national dialogue group (NDG) comprised of maritime stakeholders to identify the needs of waterway users with respect to Vessel Traffic Management (VTM) and Vessel Traffic Service (VTS) systems. A major outcome of the NDG was the development of the PAWSA process, which the Coast Guard established as the formal model for facilitating stakeholder discussion to identify VTM improvements and determine candidate VTS waterways. In 2020, CG NAVCEN modernized the PAWSA process to create a more flexible tool available to Sector Commanders to engage the maritime community for purposes of monitoring and improving the health of the MTS within their area of responsibility.
- 2. The current PAWSA process involves convening a select group of waterway users and stakeholders to facilitate a structured workshop agenda to meet pre-identified risk assessment objectives. A successful workshop involves the participation of professional waterway users with local expertise in navigation, waterway conditions, and port safety. Stakeholder involvement is central to ensuring that important environmental, public safety, and economic consequences receive appropriate attention as risk interventions are identified and evaluated. The workshop culminates in a written report that includes proposed risk mitigations developed by participants, which is made publicly available on the CG NAVCEN's website, <u>https://www.navcen.uscg.gov/ports-and-waterways-safety-assessment-final-reports</u>.
- 3. The PAWSA process strives to achieve the following objectives:
 - a. Gather stakeholder input to identify major waterway trends, safety hazards, and potential mitigation strategies.
 - b. Bolster public-private partnership and enhance cooperation across the MTS.
 - c. Generate a stakeholder driven report that captures data gathered from the PAWSA to prioritize future projects impacting the MTS.

B. Methodology

1. <u>Waterway Risk Conditions and WRFs.</u> The PAWSA process is designed to convert qualitative experience, observations, and opinions of participants into quantitative assessments. This method utilizes numerical comparison among sixteen WRFs for purposes of facilitating consensus among participants to better inform conversations regarding risk mitigation strategies within an identified study area. The Waterway Risk Condition categories and associated WRFs are outlined in Table 1 below and further defined in Appendix B.

Waterway Risk Conditions	Navigation	Vessel Quality & Operation	Traffic	Waterway
Winds Currents and Tides WRFs		Large Commercial Vessels	Volume of Commercial Traffic	Dimensions
		Small Commercial Vessels	Volume of Recreational Traffic	Obstructions
	Visibility Restrictions Commercial Fishing Vessels	Waterway Use	Visibility Impediments	
	Bottom Type	Recreational Vessels	Congestion	Configuration

Table 1- The four Waterway Risk Condition categories and sixteen WRFs.

2. <u>Waterway Risk Model.</u> The PAWSA Waterway Risk Model defines risk as the product of the probability of an unwanted event and the consequences resulting from that event. Figure 1 provides a visualization of the relationship between the probability of an unwanted event for each Waterway Risk Condition and the impact of the risk in terms of Immediate and Subsequent Consequences. Appendix B provides an explanation of Immediate and Subsequent Consequences as defined by the PAWSA Waterway Risk Model.



Figure 1- Relationship between risk, likelihood, and impact.

- 3. <u>WRF Survey.</u> During day one of the workshop participants are led through individual discussions for each WRF identified in Table 2. Each discussion concludes with the completion of a three-part participant survey that establishes the BRV and Risk Characterization for each risk factor. Following completion of all surveys, the WRFs are numerically prioritized by BRV and Risk Characterization from greatest to least. At the beginning of the second day of the workshop, the order of the risk factors are presented to participants for validation and consensus to prioritize mitigation strategy discussions and development. A description of the methodology to calculate the BRV and Risk Characterization is provided in the following sub-sections.
 - a. <u>BRV.</u> This value is calculated using numerical values attained from Part One and Part Two of the survey that are then input into the formula outlined in Figure 2.
 - (1) <u>Part One.</u> The first section of the survey asks participants to evaluate the Risk Level of a specific risk factor based on four options specific to each individual WRF. Risk Levels are presented as written options to participants. Each written option has an associated numerical value between one and four based on their likelihood. Appendix B contains a list of the WRFs and the associated Risk Level options with their attributed numerical value.
 - (2) <u>Part Two.</u> The second section of the survey asks participants to assign the Impact Level for Immediate and Subsequent Consequences associated with each risk factor. Appendix B contains the list and definition of Immediate and Subsequent Consequences.
 - (a) The Impact Level of Immediate and Subsequent Consequence are presented as three choices for each WRF. The choices correlate to the numerical values shown in Table 2.

Impact Level of Consequence	Numerical Value
None or hardly any	
impacts	0
Moderate impact	0.5
Impacts are likely severe	1

Table 2- Impact level of consequences with associated numerical value.

(b) The numerical values for Risk Level from Part One and Impact Level from Part Two of the survey are used in the formula outlined in Figure 2 to calculate the associated BRV for each WRF. The BRV numerically ranges between zero and eight, with zero representing low BRV and eight representing high BRV.

$\mathbf{P}\mathbf{D}\mathbf{V} = (\mathbf{D}\mathbf{i}\mathbf{c}\mathbf{k} \mathbf{a}\mathbf{v}\mathbf{e}\mathbf{l})\mathbf{v}$	\sum Immediate Consequences	\sum Subsequent Consequences	
$DRV = (RISK level)^{(1)}$	4	4)	

Figure 2- Risk Value formula.

- b. <u>Risk Characterization</u>. Risk Characterization is ascertained from Part Three of the survey. It provides additional context to the BRV generated from Part One and Part Two of the survey and is mainly used by facilitators to better guide participant discussion.
 - (1) <u>Part Three.</u> The third section of the survey asks participants to evaluate Risk Characterization in terms of the Current Risk Level, Risk Trend, and Current Mitigations. Table 3 provides the associated available selections for each Risk Characterization Category. Questions to ascertain Risk Characterization are standard for all WRFs. The answers to these questions are calculated by plurality, wherein the option that was most frequently selected by participants serves as the prevalent group consensus for each question. In the event a plurality cannot be determined, PAWSA facilitators examine the raw data and determine the most appropriate selection.

Risk Characterization Category	Available Selections
	We could benefit by accepting more risk
Current Pick Lavel	The level of risk is acceptable, keep the status
Current Risk Level	quo
	Unacceptably high risk
	Increasing
Risk Trend	Decreasing
	Staying the same
	Acceptable
Current Mitigations	Acceptable, but tenuous
	Unacceptable, we need more or better
	mitigations

Table 3- WRF Survey Part Three, Risk Characterization categories.

CHAPTER 2. WILMINGTON PAWSA WORKSHOP

A. PAWSA Study Area

 The geographical area for the Wilmington PAWSA included the Cape Fear River and near eastern coastal regions as depicted in Figure 3. The coordinates bounding the Wilmington study area were: 34.35 N, 078.34 W and 33.55 N, 077.64 W. Graphic representations of this study area were used to facilitate discussion with participants. Additionally, geographically referenced comments were collected during the workshop and are documented as a chartlet in Appendix D.



Figure 3- Wilmington PAWSA workshop study area.

B. BRV



1. The resultant BRV using the methodology described in Chapter 1.C for the Wilmington PAWSA workshop is depicted in Figure 4.

Figure 4- Wilmington PAWSA workshop WRF BRV.

2. The five highest priority WRFs and their associated Waterway Risk Condition for the Wilmington PAWSA prior to combining the BRV with the Risk Characterization results are documented in Table 4.

Waterway Risk Condition	WRF
Vessel Quality & Operation	Large Commercial Vessel Quality
Navigation	Tides & Currents
Vessel Quality & Operation	Recreational Vessel Quality
Traffic	Volume of Commercial Traffic
Traffic	Waterway Use

Table 4- Five highest priority WRF based on BRV.

C. Risk Characterization

1. The resultant Risk Characterization using the methodology described in Chapter 1.C for the Wilmington PAWSA workshop is depicted in Table 5.

WRF Risk Characterization				
Waterway Risk Condition	WRF	Current Risk Level	Current Risk	The Current Mitigations
Navigation	Winds	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable but tenuous
Navigation	Tides and Currents	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable
Navigation	Visibility Restrictions	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable but tenuous
Navigation	Bottom Type	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable
Vessel Quality & Operation	Large Commercial Vessels	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Vessel Quality & Operation	Small Commercial Vessels	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable
Vessel Quality & Operation	Fishing Vessels	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable but tenuous
Vessel Quality & Operation	Recreational Vessels	Unacceptably high risk.	Increasing	Unacceptable, we need more/better mitigations
Traffic	Volume of Commercial Traffic	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Traffic	Volume of Recreational Traffic	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Traffic	Waterway Use	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Traffic	Congestion	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Waterway	Dimensions	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable but tenuous
Waterway	Obstructions	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable
Waterway	Visibility Impediments	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable but tenuous
Waterway	Configuration	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable but tenuous

Table 5- Wilmington PAWSA workshop WRF Risk Characte	erization.
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D. Validation WRF Prioritization.

1. The combined WRF BRV and Risk Characterization results are depicted below in Table 7. These results were presented to participants to validate the prioritization order of WRFs for mitigation strategy dialogue and development. The rows highlighted in green in Table 6 represent the highest priority WRFs for the Wilmington PAWSA workshop participants following the prioritization validation discussion.

			Risk Characterization		
Waterway	WRF	BRV	Current Risk Level	Current	The Current
Risk Condition				Risk Trend	Mitigations Are
Vessel Quality	Large Commercial	3 37	Accentable keen	Same	Accentable but tenuous
and Operations	Vessel Quality	5.57	the status quo	Same	Acceptable but tenuous
Navigational	Tides and Currents	2 50	Unaccentably high	Increasing	Unaccentable, we need
Conditions	Thes and Currents	2.37	risk	mereasing	more/better mitigations
Vessel Quality	Rec Vessel Quality	2.31	Unacceptably high	Increasing	Unacceptable, we need
and Operations			risk	U	more/better mitigations
Traffic	Volume of	2.19	Acceptable, keep	Increasing	Unacceptable, we need
	Commercial Traffic		the status quo		more/better mitigations
Traffic	Waterway Use	1.70	Acceptable, keep	Increasing	Unacceptable, we need
			the status quo	_	more/better mitigations
Navigational	Bottom Type	1.56	Acceptable, keep	Increasing	Unacceptable, we need
Conditions			the status quo		more/better mitigations
Navigational	Winds	1.55	Acceptable, keep	Increasing	Unacceptable, we need
Conditions			the status quo		more/better mitigations
Vessel Quality	Fishing Vessel	1.52	Acceptable, keep	Increasing	Acceptable but tenuous
and Operations	Quality		the status quo		
Vessel Quality	Small Commercial	1.20	Acceptable, keep	Increasing	Acceptable but tenuous
and Operations	Vessel Quality		the status quo		
Traffic	Volume of Rec	1.18	Acceptable, keep	Same	Unacceptable, we need
	Vessel Traffic		the status quo		more/better mitigations
Waterway	Dimensions	1.09	Acceptable, keep	Same	Acceptable
			the status quo		
Waterway	Visibility	1.00	Acceptable, keep	Same	Acceptable but Tenuous
	Impediments		the status quo		
Traffic	Congestion	0.96	Acceptable, keep	Same	Unacceptable, we need
			the status quo		more/better mitigations
Navigational	Visibility	0.95	Acceptable, keep	Same	Unacceptable, we need
Conditions	Restrictions		the status quo		more/better mitigations
Waterway	Obstructions	0.89	Acceptable, keep	Same	Acceptable
			the status quo		
Waterway	Configuration	0.76	Acceptable, keep	Same	Acceptable but tenuous
			the status quo		

Table 6- Combined BRV and Risk Characterization results for all WRFs.

2. Following subjective evaluation, participants selected Recreational Vessels, Volume of Recreational Vessel Traffic, Waterway Use, Obstructions, Winds, Tides & Currents and Visibility Impediments as the most significant WRFs that contributed to potential incidents in the Wilmington PAWSA study area. WRFs were ordered by the participants' criticality of concern. Table 7 presents the concerns in descending order of priority, from the most to the least significant. The mitigation strategies were discussed and developed in this order.

Waterway Risk Condition	WRF
Vessel Quality & Operation	Recreational Vessels
Traffic	Volume of Recreational Vessels
Traffic	Waterway Use
Waterway	Obstructions
Navigation	Winds
Navigation	Tides & Currents
Waterway	Visibility Impediments

Table 7- Validated and prioritized WRFs listed from top to bottom.

E. Risk Mitigation Strategies

- The validated list of WRFs was used to prioritize discussion and development of risk mitigation strategies. Facilitators directed participants to capture potential mitigation strategies on sticky notes, which were then consolidated and grouped to identify major themes. From this bank of action items, participants were encouraged to create specific, measurable, actionable, realistic, and timebound (SMART) goals as well as general goals. Both kinds of mitigation strategies developed by participants are represented in this report. Recommended mitigation strategies documented in this section received consensus among workshop participants. Mitigation strategies are documented in order of significance to participants.
- 2. Participant comments are listed in Appendix C of this report and are referenced throughout this subsection to provide support of documented developed mitigation strategies.

3. <u>WRF – Recreational Vessels.</u>

a. Participants stated that the significant migration of recreational vessels in the Intracoastal Waterway (ICW) and Cape Fear River, particularly during the fall and spring seasons when "snowbirds" transit, presents several safety and navigational challenges. Many transient boaters are unfamiliar with changes in buoys and day beacons due to the different marking system on the ICW, leading to potential navigational errors as they exit the ICW. The rise of inexperienced operators, especially from tourist rental companies, exacerbates the issue, as these individuals often lack essential training in safe boating practices. Additionally, events like regattas frequently fail to communicate their plans effectively, creating confusion on the water. Many recreational vessels operate over known sandbars without awareness of water depth, increasing the risk of grounding, while activities such as waterskiing and tubing add further dangers in congested areas. Addressing these challenges requires a multifaceted approach involving enhanced education, clear communication about navigational changes, coordinated event planning, and increased enforcement of safety regulations to foster a culture of responsible boating. Participants recommended the following additional mitigations:

- (1) Increase funding for all law enforcement agencies in the region to address critical personnel and resource shortages. The City of Wilmington currently faces a deficit of 60 police officers, while Brunswick County's Marine Patrol Division is limited to just two officers. Additionally, Coast Guard Station Oak Island is heavily engaged in High Interest Vessel boardings and escorts, which restricts their capacity to conduct recreational vessel inspections and diminishes their overall presence on the water, risking crew fatigue. Enhanced funding will enable the opportunity to hire additional personnel and allocate necessary resources, ultimately improving public safety and law enforcement effectiveness in the area.
- (2) Introduce legislation that mandates rental companies to only rent to operators who possess a valid boating license and have undergone on-water training. Additionally, the expansion of licensing requirements for recreational vessel operators should include a practical on-water training component, along with establishing reciprocity between state and federal laws to ensure effective law enforcement. For example, while state law requires all boat operators born after January 1, 1988, to be licensed, the Coast Guard cannot enforce this law, and local law enforcement agencies lack the authority to enforce federal regulations such as the lanyard law. Furthermore, rental companies providing guided tours on jet-skis, should be required to obtain a 6-passenger license (6-Pack), as they are delivering a service to paying customers. This legislation should also stipulate that rental companies provide comprehensive training for renters on critical topics such as no-wake zones, safe distances from large commercial vessels, and general boating safety information. It is important to note that while rental companies may oppose regulations that limit who can rent their vessels, these measures are essential for enhancing safety and responsibility on the water.
- (3) Continue working with local Auxiliary flotilla to enhance the dissemination of information regarding their training programs. Maintain a proactive presence at boat shows, dealerships, and boat ramps to engage with the community. Actively liaise with local news outlets to promote upcoming training course dates and details through commercials and social media channels. Additionally, incorporate Auxiliary training brochures into the information packets provided to new purchasers of recreational vessels to further raise awareness and accessibility.

4. <u>WRF – Volume of Recreational Traffic.</u>

a. Participants noted two main issues in regard to volume of recreational traffic. As "snowbirds" transition between their summer and winter residences, there is a notable increase in seasonal traffic and excessive radio communications. Additionally, the

Southport fireworks have been found to obstruct the shipping channel when vessels are entering the port concurrently with the event. Participants recommended the following additional mitigations:

- (1) Increase the presence of federal and local law enforcement agencies to enhance safety and efficiency during peak migration periods between Snow's Cut and Southport. This can be achieved by securing additional funding to bolster personnel and resources, enabling a more robust maritime presence during critical times. Moreover, it is crucial to educate transient "snowbird" mariners about local communication protocols. Clear guidance should be provided to ensure that they refrain from using certain channels (bridge to bridge communications), allowing larger commercial vessels to coordinate passing arrangements effectively. Additionally, participants recommend installing informative signage on day beacons along the waterway and the Intracoastal Waterway (ICW). These signs should outline proper radio etiquette and communication protocols for transiting mariners, thereby promoting safer navigation practices.
- (2) The Municipality of Oak Island has temporarily restricted access to its section of the river for large commercial traffic by submitting a marine event permit to Coast Guard Sector North Carolina. This is due to the increased volume of recreational boaters during their fireworks display. Other municipalities along the Cape Fear River should consider implementing similar restrictions for large commercial traffic during their own fireworks events to ensure the safety and enjoyment of all participants.

5. <u>WRF – Waterway Use.</u>

- a. Participants identified the annual Swim the Loops and Mott's Channel Sprint swim as events that significantly obstruct the entire channel. It appears there is a lack of awareness about this event, despite its regular occurrence each year. Participants recommended the following additional mitigation:
 - (1) Event organizers should engage with local law enforcement agencies and Coast Guard Station Wrightsville Beach during the planning process to ensure that all parties are informed of the necessary requirements. Furthermore, it is essential to issue social media announcements to notify the boating public about the channel closure due to the race.

6. <u>WRF – Obstructions.</u>

- a. Participants observed that the prevalence of derelict and sunken vessels is a growing concern within the study area, particularly following tropical storms or hurricanes. Participants recommended the following additional mitigations:
 - (1) Establish a state or national program that implements a hotline or online platform enabling boat owners to responsibly dispose of their vessels. This initiative could provide an incentive program, akin to a "cash for clunkers" model, to encourage owners to relinquish their boats rather than abandon them, thereby reducing the

incidence of derelict and sunken vessel.

- (2) Encourage the state of North Carolina to adopt a derelict vessel policy for all coastal counties similar Chapter 1-9, Article IX of the Brunswick County Code of Ordinances.
- (3) It was also stated that the National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program has awarded funding to Boat US to provide grants to certified non-federal partners for the removal of sunken and derelict vessels.
- b. Participants noted floating trees and debris, commonly referred to as "deadheads," are prevalent in the river, particularly following severe storms. Their presence poses significant safety risks. Participants recommended the following additional mitigation:
 - (1) The locks and dams located in Regalwood (Lock & Dam #1) and Elizabethtown (Lock & Dam #2), operated by the Army Corps of Engineers, should proactively communicate the quantity and type of debris moving downstream to the boating public, particularly the Pilots Association. Additionally, participants stated that the local community should report any observed debris in the river to local law enforcement and the Coast Guard through the "See It/Say It" program. This collaboration will enhance safety and navigation on the waterway.
- c. The permanently moored local battleship is supplied with water via a pipeline connected to the city of Wilmington. This pipeline is currently secured with sandbags. However, in the event of a strong storm surge, the pipeline may become dislodged, leading to significant safety concerns. Participants recommended the following additional mitigation:
 - (1) Engage with the Battleship North Carolina and the City of Wilmington to explore options for permanently burying or securely affixing the water supply pipeline from Wilmington to the Battleship.
- d. Participants stated that there is no communication from the bridge operators on the Cape Fear Bridge to the boating public regarding bridge openings, particularly for individuals who are not regular users of the waterway or who are unfamiliar with the area. Participants recommended the following additional mitigation:
 - (1) Enhance signage that displays bridge contact information (VHF and cell phone) for underway mariners. Additionally, consider including this contact information in the Coast Pilot for improved accessibility.
- 7. <u>WRF Winds.</u>
 - a. Participants identified hurricanes and tropical storms as significant concerns for the region. Furthermore, winds can change abruptly during afternoon storms. These popup storm cells can produce considerable wind gusts. Current mitigation measures

include timely notifications from NOAA, which alert the maritime community when they are within ten miles of severe weather. Participants recommended the following additional mitigation:

- Engage with Sector North Carolina to enhance awareness of these measures by including informational text in local Coast Guard Marine Safety Information Bulletins (MSIB) that are distributed to port partners.
- b. Participants noted the lack of real-time wind data offshore. The only wind sensor near the mouth of the river is located atop the pilot tower in Southport, but it lacks accuracy when winds originate from the north. While there is another wind sensor at the state port, the sensor information is not publicly accessible due to subscription limits. Participants recommended the following additional mitigation:
 - (1) Engage with NOAA to advocate for the installation of additional sensors at Carolina Beach State Park, Fort Fisher, Bald Head Island, the state port, and nearby sea buoys.
- 8. <u>WRF Currents.</u>
 - a. Storm surge from tropical storms and hurricanes can lead to substantial flooding and subsequent infrastructure damage. Participants recommended the following additional mitigation:
 - (1) Collaboration with local municipalities to ensure docks, bollards, and cleats are adequately maintained, to prevent damage during periods of high currents and flooding.
 - b. Another issue identified by participants was the lack of current data beyond the tide chart. There is a clear need for real-time tide and current information. Participants recommended the following additional mitigation:
 - (1) Engage with NOAA to install live sensors at the mouth of the river, Snow's Cut, and adjacent to the state port to facilitate the collection of real-time data.
- 9. <u>WRF Visibility Impediments.</u>
 - a. Shrimp boats anchoring in the channel or along its edge often illuminate all deck lighting, creating visibility challenges for Bald Head Island ferries and other commercial traffic transiting the area. Additionally, there is a noticeable lack of communication, as these vessels do not appear to monitor their radios effectively and may be unfamiliar with appropriate anchoring locations. Participants recommended the following additional mitigations:
 - (1) Engage with Coast Guard District Five and the Sector North Carolina Waterways Division to establish a designated anchorage area near buoy 23 for shrimp vessels. This initiative aims to keep these vessels out of the channel, thereby ensuring

unimpeded navigation for larger commercial vessel traffic.

- (2) Report shrimp boats to the U.S. Coast Guard Sector North Carolina for anchoring in the channel, as this practice impedes the safe navigation of commercial traffic.
- b. Participants also noted that the Southport traffic light creates confusion among vessel traffic on the waterway, depending on the activation of the red and green signals. Participants recommended the following additional mitigation:
 - (1) Engage with the North Carolina Department of Transportation to conduct a study on the possibility of reorienting or providing covers for the traffic light to prevent its illumination from affecting the navigable channel.
- c. The final issue the participants brought forward was that the Southport rear range is obstructed by the growth of trees and foliage situated between the forward and rear ranges. Participants recommended the following additional mitigation:
 - (1) Engage with Coast Guard District Five and the Sector North Carolina Waterways Division to conduct a study on the feasibility of either raising the rear range above the tree line or relocating the range entirely, taking into account potential height restrictions imposed by Southport city ordinances and nearby airport traffic. In the short term, request that Coast Guard Aids to Navigation Team Oak Island and Sector North Carolina Waterways Division install a Precision Entrance Light lantern on the front range tower at the Southport entrance range to enhance visibility.

10. Harbor Safety Committee

a. The Port of Wilmington does not have a Harbor Safety Committee (HSC). Establishing a HSC in a port is a common mitigation strategy to facilitate engagement between port partners and government agencies to address various issues within the local MTS. Participants recommended formation of a HSC for the Port of Wilmington. The proposed structure includes a primary HSC, with potential to establish regional subcommittees for the Northern Area of Responsibility (AOR), encompassing Wrightsville Beach, and the Southern AOR, encompassing Oak Island and Brunswick. This framework will enable targeted initiatives tailored to the unique needs of each region.

Participant	Organization
F	erries
1. Tom Goldner	Bald Head Island Transportation
2. Christopher Parker	Bald Head Island Transportation
Pub	lic Safety
3. Jason Fuller	New Hanover County Emergency Management
4. Joshua Hikade	New Hanover County Sherriff's Office
5. Saxon Owens	Brunswick County Sherriff's Office
6. Adam Phillips	Wilmington Police Department
7. Amanda Rall	USCG Station Wrightsville Beach
8. Courtney Sergent	USCG Sector North Carolina Deputy
9. Lou Stanton	USCG Auxiliary
10. John H. Stephenson	Wilmington Fire Department
Maintenance and	Physical Infrastructure
11. Michael Gibb	USCG Aids to Navigation Station Oak Island
12. Carl Hendrickson	USCG Sector North Carolina Waterways
13. Todd Horton	US Army Corps of Engineers
14. Wayne Reed	USCG Sector North Carolina Waterways
15. Kyle Ward	NOAA
16. Erin Weller	US Army Corps of Engineers
Port Operations	
17. Brad Allen	Norton Lilly
18. Erica Custis	Moran Towing
19. John Dittmar	North Carolina Ports
20. Brent Gainey	Cape Fear Pilots
21. Brian Jeno	Cape Fear Community College
22. Kameron Knight	Cape Fear Community College
23. David Utz	Military Onload Terminal Sunny Point (MOTSU)

Appendix A. Workshop Participants

Appendix B. Waterway Risk Model Terms and Definitions

- A. Waterway Risk Conditions and WRF Definitions. The Ports and Waterway Safety Assessment (PAWSA) Waterway Risk Model utilizes sixteen WRFs categorized under four Waterway Risk Conditions. Definitions for each Waterway Risk Condition and their associated WRF are defined in this section.
 - 1. <u>Waterway Risk Condition Navigation</u>. The environmental conditions that affect vessel navigation, such as wind, currents, and weather.
 - a. <u>WRF -Winds.</u> The difficulty in maneuvering vessels resulting from increased and unpredictable winds, particularly if the wind is from abeam.
 - b. <u>WRF Tides and Currents.</u> The difficulty in maneuvering vessels caused by water movement flow and speed, often affected by seasonal variations and sustained winds. Tide rips and whirlpools can be created by strong currents and affect the maneuverability of smaller vessels. The frequency of occurrence and the location of the strongest currents in the waterway are critical considerations (e.g., if current speed can exceed vessel speed, timing is critical when transiting the area).
 - c. <u>WRF Visibility Restrictions.</u> The natural conditions that may prevent a mariner from seeing other vessels, aids to navigation, or landmarks, such as fog, severe rain squalls, etc.
 - d. <u>WRF Bottom Type.</u> The material on the waterway bottom or just outside the channel, such as hard rock, mud, coral, etc.
 - 2. <u>Waterway Risk Condition Vessel Quality and Operations</u>. The quality of vessels and their crews that operate on a waterway. Each waterway has what are considered to be high risk vessels, such as old vessels, vessels with poor safety records, vessels registered in certain foreign countries, vessels belonging to financially strapped owners, vessels with inexperienced crews and operators, etc. When assessing risk, the following items should be considered (as appropriate) for each risk factor: maintenance, age, flag, class society, ownership, inspection record, casualty history, language barriers, fatigue related issues, and local area knowledge.
 - a. <u>WRF Large Commercial Vessels.</u> The quality of the large commercial vessel itself and the proficiency and quality of the crew. Large vessels are those ocean-going vessels, often in international trade, that usually are constrained by their draft to use dredged channels where such channels exist. Large vessels include such things as: oil tankers, container ships, break bulk cargo ships, and cruise liners.
 - b. <u>WRF Small Commercial Vessels.</u> The quality of the small commercial vessel itself and the proficiency and quality of the crew. Small vessels include all other commercial craft EXCEPT commercial fishing vessels. Examples

include tugs and towboats, offshore supply vessels, charter fishing boats, and small passenger vessels (inspected under 46 CFR Subchapters T and K), such as dinner cruises and ferries.

- c. <u>WRF Commercial Fishing Vessels.</u> The quality of the commercial fishing vessel itself and the proficiency and quality of the crew. These vessels are included because they are not required to undergo annual vessel inspections nor are the crewmembers required to hold USCG licenses; therefore, there may be a greater potential for increased incidents involving commercial fishing vessels.
- d. <u>WRF Recreational Vessels.</u> The quality of the recreational vessel itself and the proficiency and operating knowledge of the individuals who operate them. Recreational vessels include all boats used for noncommercial purposes (e.g., pleasure craft or craft used by indigenous people for transportation or subsistence fishing). They can be powered by an engine, the wind, or human exertion. Examples include yachts, personal watercraft (a.k.a., jet skis), and kayaks. Besides local knowledge, understanding of the rules of the road and inebriation also should be considered for this risk factor.
- 3. <u>Waterway Risk Condition Traffic Conditions.</u> The number of vessels that use a waterway and their interactions.
 - a. <u>WRF Volume of Commercial Traffic.</u> The amount of commercial vessel traffic using the waterway (i.e., the more vessels there are on the water, the more likely that there will be a marine casualty). Deep draft and shallow draft commercial vessels as well as commercial fishing vessels are included in this risk factor. Shoreside infrastructure is also addressed in this risk factor (i.e., can it handle the volume of commercial traffic within the waterway).
 - b. <u>WRF Volume of Recreational Traffic.</u> The amount of non-commercial vessel traffic using the waterway. The volume may vary depending on the time of day, the day of the week, the season of the year, or during a major marine event.
 - c. <u>WRF Waterway Use.</u> The interaction between vessels or boats of different sizes using the same waterway and their maneuvering characteristics. Conflicts occur as risk increases with each type of vessel's maneuvering characteristics and actions that are often different and unpredictable (e.g. commercial mariners and recreational mariners using deep draft vessels and shallow draft vessels within the same waterway).
 - d. <u>WRF Congestion</u>. The ability of the waterway to handle the volume and density of traffic. Risk increases when a large number of vessels uses a small geographic area for an extended period of time. Risk also increases substantially when you get a larger than normal number of vessels together for a short time (e.g., fishing tournament or short season commercial fishery).

- 4. <u>Waterway Risk Condition Waterway Conditions.</u> The physical properties of the waterway that affect vessel maneuverability.
 - a. <u>WRF Visibility Impediments.</u> The man-made objects (e.g., moored ships, condominiums, background lighting, etc.) or geographic formations (e.g., headlands, islands, etc.) that prevent a mariner from seeing aids to navigation or other vessels.
 - b. <u>WRF Dimensions.</u> The room available for two vessels to pass each other within the waterway.
 - c. <u>WRF Obstructions.</u> Floating objects in the water that impede safe navigation and could damage a vessel, such as ice, debris, fishing nets, etc.
 - d. <u>WRF Configuration</u>. The arrangement of a waterway, including elements such as waterway bends, multiple and converging channels, and perpendicular traffic flow.
- **B.** WRF Survey. During the first day of the PAWSA workshop, facilitators guide participants through a discussion about each WRF. Following each dialogue, participants take a three-part survey that is used to prioritize the development and discussion of mitigation strategies during the second day of the PAWSA. The following sections provide the associated numerical values, selection options, and definitions for Part One and Part Two of the WRF Surveys that are utilized to calculate the BRV of each WRF.
 - 1. <u>Part One</u>. This first section of the survey asks participants to evaluate the likelihood of a specific WRF based on four available selections. Likelihoods are presented as written options to participants. Each written option has an associated numerical value between one and four based on the likelihood of the condition. Tables 1- 4 in this appendix provide the four written options and associated point value for each WRF.

Waterway Risk Condition - Navigation		
WRF - Winds		
Selection Option	Point Value	
Strong winds affect maneuverability less than twice a month and are well	1	
forecasted.		
Strong winds affect maneuverability more than twice a month but are well	2	
forecasted.		
Strong winds affect maneuverability less than twice a month but without	3	
warning.		
Strong winds affect maneuverability more than twice a month and without	4	
warning.		
WRF – Tides and Currents		
Selection Option	Point Value	
Fast tidal and seasonal currents are weak.	1	
Fastest tidal and seasonal currents are moderate.	2	
Fastest tidal and seasonal currents are strong but do not affect maneuverability.	3	
Fastest tidal and seasonal currents are strong and affect maneuverability.	4	
WRF – Visibility Restrictions		
Selection Option	Point Value	
Restricted visibility occurs less than 24 days a year.	1	
Restricted visibility occurs more than 24 days a year but usually persists less	2	
than 6 hours.		
Restricted visibility occurs more than 24 days a year but usually persists less	3	
than 24 hours.		
Restricted visibility occurs more than 24 days a year and usually persists more	4	
than 24 hours.		
WRF – Bottom Type		
Selection Option	Point Value	
Deep water throughout the waterway; no channel is needed, vessel breakdown	1	
unlikely to result in grounding or allision.		
Soft bottom with no hard obstructions.	2	
Soft bottom with some hard obstructions.	3	
Hard or rocky bottom.	4	

Table 1- Selection options and point values for WRFs categorized under the Waterway Risk Condition – Navigation.

Waterway Risk Condition - Vessel Quality and Operation		
WRF – Large Commercial Vessel Quality and Operation		
Selection Option	Point Value	
All of the large commercial vessels using the waterway are materially sound and are operated proficiently.	1	
Most of the large commercial vessels using the waterway are materially sound and are operated proficiently.	2	
Many of the large commercial vessels using the waterway are materially sound and are operated proficiently.	3	
Some of the large commercial vessels using the waterway are materially sound and are operated proficiently.	4	
WRF – Small Commercial Vessel Quality and Operation		
Selection Option	Point Value	
All of the small commercial vessels using the waterway are materially sound and are operated proficiently.	1	
Most of the small commercial vessels using the waterway are materially sound and are operated proficiently.	2	
Many of the small commercial vessels using the waterway are materially sound and are operated proficiently.	3	
Some of the small commercial vessels using the waterway are materially sound and are operated proficiently.	4	
WRF – Commercial Fishing Vessel Quality and Operation		
Selection Option	Point Value	
All of the commercial fishing vessels using the waterway are materially sound and are operated proficiently.	1	
Most of the commercial fishing vessels using the waterway are materially sound and are operated proficiently.	2	
Many of the commercial fishing vessels using the waterway are materially sound and are operated proficiently.	3	
Some of the commercial fishing vessels using the waterway are materially sound and are operated proficiently.	4	
WRF – Recreational Vessel Quality and Operation		
Selection Option	Point Value	
All of the recreational vessels using the waterway are materially sound and operated proficiently.	1	
Most of the recreational vessels using the waterway are materially sound and operated proficiently.	2	
Many of the recreational vessels using the waterway are materially sound and operated proficiently.	3	
Some of the recreational vessels using the waterway are materially sound and	4	

 Table 2- Selection options and point values for WRFs categorized under the Waterway Risk

 Condition – Vessel Quality and Operation.

Waterway Risk Condition - Traffic		
WRF – Volume of Commercial Traffic		
Selection Option	Point Value	
Light commercial traffic.	1	
Moderate Commercial Traffic.	2	
Heavy commercial traffic but waterway infrastructure handles load easily.	3	
Heavy commercial traffic and vessels regularly have to wait for berths.	4	
WRF – Volume of Recreational Vessel Traffic		
Selection Option	Point Value	
Light recreational use of the waterway.	1	
Moderate recreational use of the waterway.	2	
Heavy recreational use of the waterway but seasonal.	3	
Heavy recreational use of the waterway year-round.	4	
WRF – Waterway Use		
Selection Option	Point Value	
Predominately a single use waterway serving one interest.	1	
Multiple use waterway but no conflicts occurring.	2	
Multiple use waterway and some minor conflict occurring.	3	
Multiple use waterway and major conflicts occurring.	4	
WRF – Congestion		
Selection Option	Point Value	
No congestion ever occurs in the waterway.	1	
Congestion only occurs in small areas for limited times.	2	
Congestion occurs regularly but flow of vessel traffic is not impeded.	3	
Congestion occurs regularly and flow of vessel traffic is impeded.	4	

 Table 3- Selection options and point values for WRFs categorized under the Waterway Risk

 Condition – Traffic.

Waterway Risk Condition – Waterway Condition		
WRF – Visibility Impediments		
Selection Option	Point Value	
No visual impediments on the waterway.	1	
Visibility impediments that do not impact navigation.	2	
Visibility impediments that sometimes impact navigation.	3	
Visibility impediments that often impact navigation.	4	
WRF – Dimensions		
Selection Option	Point Value	
No waterway constrictions.	1	
Waterway constrictions (width and depth) exist but never impact navigation.	2	
Waterway constrictions (width and depth) exist and sometimes impact	3	
navigation.		
Severe waterway constrictions often impact navigation.	4	
WRF – Obstructions		
Selection Option	Point Value	
No obstructions.	1	
Some obstructions not affecting navigation.	2	
Obstructions sometimes affect navigation.	3	
Obstructions often affect navigation.	4	
WRF – Configuration		
Selection Option	Point Value	
Current waterway configuration is adequate for navigation.	1	
Current configuration is inadequate but does not pose a safety concern.	2	
Current configuration poses a safety concern.	3	
Current configuration poses a significant safety concern.	4	

Table 4-Selection options and point values for WRFs categorized under the Waterway Risk Condition – Waterway Condition.

- 2. <u>Part Two.</u> This portion of the survey asks participants to assign an Impact Level for Immediate and Subsequent Consequences for each WRF. Definitions for terms associated with Part Two of the Survey are provided in this section.
 - a. <u>Immediate Consequences.</u> The instantaneous impacts of a vessel casualty (i.e., what happens right after a collision, allision, or grounding). These include the following events or categories
 - i. <u>Personnel Injuries.</u> The maximum number of expected casualties. People can be injured, killed, or need to be rescued.
 - ii. <u>Petroleum Discharge.</u> The largest petroleum spill in the most probable worst-case scenario.

- iii. <u>Hazardous Materials Release.</u> The largest chemical or hazardous material spill in the most probable worst-case scenario.
- iv. <u>Mobility.</u> The infrastructure that is critical to the Marine Transportation System within the waterway (i.e., the significant structures upon which moving people and cargo through the marine transportation system depend). The waterway can be blocked and the shoreside Marine Transportation System can be disrupted, ultimately causing greater problems moving cargo through a port—both on the water and ashore.
- b. <u>Subsequent Consequences.</u> The longer-term effects of a marine casualty that are felt hours, days, months, and even years afterwards, such as shoreside facility shut-downs, loss of employment, destruction of fishing areas, decrease or extinction of species, degradation of subsistence living uses, and contamination of drinking or cooling water supplies. These include the following events:
 - i. <u>Health and Safety.</u> The potential consequences to the community that lives or works on or near the waterway. Risk is increased when more people live or work in close proximity to a waterway.
 - ii. <u>Environmental.</u> The risks to wetlands and endangered species and how sensitive people are to the quality of their environment. The more sensitive, the more people will expect in terms of both preparedness and response effectiveness for any marine accident that threatens environmental quality.
 - iii. <u>Aquatic Resources.</u> Water dwelling life forms harvested for commercial or recreational reasons. Timing of a marine casualty could affect the seriousness of the consequences (i.e., some species are only in the waterway at certain times of the year).
 - iv. <u>Economic.</u> The extent of the impact if a particular waterway is closed for some period.

Appendix C. Participant Comments

A. <u>Background</u>. This appendix documents participant observations and recommendations expressed during the workshop with respect to specific issues of concern within the study area. Discussion during the first day of the workshop was recorded and subsequently transcribed using professional services. Comments were compiled and categorized by most applicable Waterway Risk Condition and WRF.

B. <u>Waterway Risk Condition - Navigation</u>.

1. WRF – Winds.

- a. Hurricane season, extending from late May to late November, poses significant challenges to port operations due to unpredictable wind conditions. Typically, port partners have sufficient time to relocate vessels from the Port of Wilmington, contingent upon the location where the hurricane initially develops.
- b. Partners noted that real-time wind data offshore is limited, with the exception of the Frying Pan Tower. While there is a wind sensor located in Southport, it only provides information that is useful after vessels have entered the Cape Fear River.
- 2. WRF Tides and Currents.
 - a. Storm surge from hurricanes and severe storms can lead to substantial flooding and significantly impact currents. Storm surge is not exclusively associated with coastal hurricanes. Heavy rainfall in inland areas can result in flooding of the Cape Fear River and contribute to surge effects.
 - b. Real-time current data is unavailable. Waterway users primarily depend on tide charts and local knowledge for navigation. There is a need for current sensors throughout the study area.
- 3. <u>WRF Visibility Restrictions.</u>
 - a. Depending on the time of year, marine fog can temporarily close the port due to reduced visibility. It is important to note that while the port may be closed because of fog, offshore conditions may be clear, and vice versa.
- 4. <u>WRF Bottom Type.</u>
 - a. The primary bottom type in the study area consists of soft sand. Sandbars can form and dissipate as a result of storm activity and lead to shoaling. The Army Corps of Engineers actively works to manage and mitigate the effects of this continuous shoaling process.

C. <u>Waterway Risk Condition - Vessel Quality and Operations.</u>

- 1. WRF Large Commercial Vessels.
 - a. Power limiters continue to present challenges. Proactive communication with pilots helps mitigate risk for large commercial vessels entering the port. Vessels are supplying updated pilot cards that include anticipated speeds, which can vary in correlation with actual conditions. These ships are also scheduled based on current and tide windows to enhance navigational safety.
 - b. The quality of the crew is at its highest level since the onset of COVID-19. However, language barriers remain an ongoing challenge across all vessels. While crew members are familiar with key terminology and can effectively communicate with other mariners and pilots, participants reported utilizing a language line service to access translation support when needed.
 - c. As ships continue to increase in size, the availability of assist tugs on standby to guide these larger vessels into port is increasingly limited. This situation raises significant safety concerns, particularly in the event of a power failure onboard a large vessel.
 - d. Larger vessels create wakes that impact smaller vessels north of Snow's Cut, particularly in the area where the ICW merges with the Cape Fear River.
- 2. WRF Small Commercial Vessels.
 - a. Unlicensed mariners are conducting illegal passenger operations and transporting passengers to islands along the ICW and offshore. This is prevalent in in New Hanover County. There is a significant lack of funding for the New Hanover County Sheriff's Office, which limits the capacity for increased law enforcement presence on the water. This situation raises substantial safety concerns, as these vessels lack proper licensing and inspection.
- 3. <u>WRF Commercial Fishing Vessels.</u>
 - a. Shrimp boats anchoring in and along the channel are activating all deck lighting. This degrades visibility for Bald Head Island ferries and other vessel traffic. The situation is exacerbated by a lack of communication, as these vessels are not monitoring their radios and may not be familiar with appropriate anchoring locations.
- 4. <u>WRF Recreational Vessels.</u>
 - a. There is a notable seasonal migration of recreational vessels within the ICW and the Cape Fear River. In the fall, recreational boaters from northern regions transit south using the ICW and make the reverse voyage from the south back north in the spring. Many recreational boaters lack comprehensive knowledge regarding changes to buoys and day beacons upon exiting the ICW and entering the Cape Fear River.
 - b. The popularity of recreational vessels has been on the rise, yet a significant number of

these vessels lack radio communication systems. Many new operators enter the water without adequate training in safe boating practices. Auxiliarist organizations have reported that COVID-19 has impacted their training programs; however, they are now increasing the availability of courses for the public. Furthermore, recreational vessels are frequently navigating over known sandbars without a proper understanding of water depth, which poses safety risks, particularly during watersports activities such as waterskiing and tubing.

c. Tourist rentals, including paddleboats and jet skis, often involve operators who are unfamiliar with the local area. This lack of familiarity not only affects the individuals operating the vessels but also raises concerns regarding the rental companies' responsibilities in ensuring the safety and awareness of their customers. It is essential for rental companies to provide thorough guidance and local knowledge to enhance safety and promote responsible usage of these recreational vessels.

D. Waterway Risk Condition - Traffic.

- 1. WRF Volume of Commercial Traffic.
 - a. There is a notable increase in commercial vessel traffic on the river and an existing capacity to support additional growth.
- 2. <u>WRF Volume of Recreational Traffic.</u>
 - a. There are recreational vessel seasonal traffic spikes and increased radio chatter due to the presence of "snowbirds" from the northern regions transiting in or through the area during the fall and back towards the north in the spring.
 - b. The Southport fireworks display obstructs the shipping channel when vessels enter the port during the event.
- 3. <u>WRF Waterway Use.</u>
 - a. Participants identified the annual Swim the Loops and Mott's Channel Sprint swim as events that significantly obstruct the entire channel. There is a lack of awareness of this event, despite its regular occurrence each year.
- 4. WRF Congestion.
 - a. When colleges and schools are out of session, there is a notable increase in vessel congestion due to the influx of recreational boats.
 - b. The seasonal migration of boaters from the north to the south in the fall, and from the south back to the north in the spring, contributes to significant congestion along the route from Snow's Cut to Southport.

E. <u>Waterway Risk Condition – Waterway.</u>

1. <u>WRF – Dimensions.</u>

a. Dredging and expansion of the shipping channel is needed to alleviate the impact of larger immobilized vessels obstructing access to and from the Military Ocean Terminal Sunny Point (MOTSU) and the State Port at in vicinity of Buoy 27. This proactive measure will enhance navigational safety and ensure uninterrupted operations in the area.

2. <u>WRF – Obstructions.</u>

- a. The increasing number of derelict vessels throughout the area is a growing concern. While those that obstruct navigation are promptly removed, concern exists for vessels outside the designated channel. These vessels pose a risk of breaking free and may potentially impede traffic or collide with transiting vessels.
- b. Floating trees and debris, commonly referred to as "deadheads," are prevalent in the river, particularly following severe storms. Their presence poses significant safety risks.
- c. The permanently moored local battleship is supplied with water via a pipeline connected to the city of Wilmington. This pipeline is currently secured with sandbags. However, in the event of a strong storm surge, the pipeline may become dislodged, leading to significant safety concerns.

3. <u>WRF – Visibility Impediments.</u>

- a. The location and angle of the Southport automobile traffic light is visible to waterway users and sometimes creates confusion to vessel operators during activation of red and green traffic light signals.
- b. The Southport rear range is obstructed by the growth of trees and foliage situated between the forward and rear ranges.

4. <u>WRF – Configuration.</u>

- a. Expand and deepen the shipping channel to mitigate the impact of larger immobilized vessels that may impede or restrict access to and from MOTSU and State Port Control.
- b. The 90-degree turn at Southport, at the intersection of the ICW, poses significant hazards, particularly for transient boaters who may be unfamiliar with the area. This situation increases the risk of navigational errors and accidents.

Appendix D. Geospatial Participant Comments

Facilitators captured participant observations that made specific geographic references. Those observations were then transferred to an ArcGIS online web-application to generate the chartlets reflecting the location and specific context of each comment. The chartlets are included below and represented as Figures 1-7.

	Geospatial Comments	
Point	Comment	
	There is a need for an enforceable 'No Wake Zone' from the Cape Fear Memorial Bridge to	
1	the Isabelle Holmes Bridge due to population growth and increased vessel traffic.	
	At the Port of North Carolina, heavier tonnage ships are held to a tide and current restriction	
2	and can only leave at certain times of the day.	
3	More lights are needed on Aids to Navigation (AToN) up and down the river.	
	Large wakes from commercial vessels are affecting homeowners by constant erosion and	
4	damage to docks and property.	
5	Illegal passenger vessel operations in ICW are transporting passengers to islands or offshore.	
	Heavier/bigger vessels create strong wakes that capsize smaller boats in vicinity of Snow's	
6	Cut and where the ICW meets the Cape Fear River.	
	Recreational boaters transiting ICW through Snow's Cut and continuing southbound on the	
7	Cape Fear River get confused by the change of navigation scheme, where the green and red	
	buoys are reversed. Boaters often continue towards MOTSU restricted waters.	
	More enforcement is needed during heavy tourist season from late spring to end of summer	
8	due to significantly increased recreational vessel traffic. Numerous recreational vessel	
	incursions impact the safe navigation of larger vessels entering and exiting MOTSU.	
	Dredge or expand the shipping channel to mitigate the impact of larger immobilized vessels	
9	impeding access to and from MOTSU and State Port.	
	Quarantine Station remains unlit even though it was approved by Coast Guard for activation	
10	in 2014, following a deadly boating accident in 2012.	
	There is an increasing number of recreational vessels operating in this area. This is seasonal,	
11	as recreational vessels migrate north and south in the spring and fall.	
10	Dredge pipe and cables are laying on bottom just outside the channel. Anchors have been	
12	fouled in them numerous times.	
10	The Southport traffic light can be seen when coming in at night, which can cause confusion	
13	with the rest of the AloN in the area.	
	Unannounced sailing regattas occur around Southport. Particularly, in the vicinity of Morning	
14	Star Marina and South Harbor Village Marina.	
15	It is very difficult to see the rear ranger marker at night for in-bound traffic.	
16	Day markers without lights are being struck at night by vessel traffic.	
1.5	There is a sunken sailboat by the range marker off of Caswell Beach. Its mast protrudes the	
17	surface of the water.	
18	Shrimp boats anchor in or near the channel with very bright deck lights. This obscures AToN.	
	Strong currents meet strong wind at Bald Head Island. Conditions here can be vastly different	
10	than one mile away. The need for live wind and current sensors here is a must for the future	
19	of the port.	

Table 1 – Geospatial Comments



Figure 1 – Mapped location of geospatial comments of Participants



Figure 2 – Mapped location of geospatial comments of Participants



Figure 3 - Mapped location of geospatial comments of Participants



Figure 4 - Mapped location of geospatial comments of Participants



Figure 5 - Mapped location of geospatial comments of Participants



Figure 6 - Mapped location of geospatial comments of Participants



Figure 7 - Mapped location of geospatial comments of Participants